

REMARKS

The Application has been carefully reviewed in light of the Office Action dated June 22, 2004 (Paper No.10). Claims 8 to 13, 15, 16, 18 and 19 are cancelled without prejudice or disclaimer of the subject matter. Claims 1 to 7, 14, 17 and 20 to 22 are in the application, of which Claims 1, 14, 17 and 22 are independent. Claims 1 to 7, 14, 17, 20 and 21 are being amended, and Claim 22 is being added. Reconsideration and further examination are respectfully requested.

The Office Action raises an objection to the Abstract. In response, the Abstract is being amended, as suggested in the Office Action. Reconsideration and withdrawal of the objection are respectfully requested.

Claim 7 is rejected under 35 U.S.C. § 112, second paragraph. In response, Claim 7 is amended. Reconsideration and withdrawal of the rejection are therefore respectfully requested.

Claims 1 to 7, 14, 17, 20 and 21 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,995,095 (Ratakonda). Reconsideration and withdrawal of the rejection are respectfully requested for the reasons set forth herein.

The present invention generally concerns extracting key frames from a video sequence. More particularly, according to the present invention, frames are clustered according to their dominant direction, which is determined for each frame based on a global motion of the frame represented by global motion signals.

More particularly, turning to the specific language of the claims, Claim 1 defines a method of extracting key frames from a video sequence, wherein the video

sequence comprises compressed video data having motion vectors. For each frame of a plurality of frames of the video sequence, global motion signals are generated based on the motion vectors, wherein the global motion signals are representative of a global motion of the frame. For each frame of the plurality of frames of the video sequence, a dominant direction of the global motion of the frame is determined from the generated global motion signals associated with the frame. The plurality of frames are clustered according to their determined dominant directions, and key frames are selected from the clusters of frames. The selected key frames are decompressed to obtain the extracted key frames.

The applied art, namely Ratakonda, is not seen to teach each and every one of the above-identified features, particularly as regards extracting key frames from a video sequence by determining a dominant direction for each of a plurality of frames in the video sequence from generated global motion signals for the frame, clustering a plurality of frames according to their determined dominant directions, and selecting key frames from the clusters of frames.

Ratakonda is seen to describe a method of summarizing digital video using a hierarchy of key frames, with the coarsest summarization level containing the least number of, and most salient, frames. (See Ratakonda, col. 2, lines 29 to 36) More particularly, Ratakonda is seen to summarize digital video by first identifying shot boundaries (i.e., scene changes) by analyzing color histograms, and then determining key frames for each shot. (See Ratakonda, Figure 2, and col. 4, commencing at line 36) Reference is respectfully made to Figures 2 and 3 of Ratakonda, wherein it is shown that those portions of the video in which motion is detected are excluded as frames. While

Ratakonda is seen to discuss clustering, at col. 9, commencing at line 40, the clustering is seen to be based on color histograms derived from the video images.

Thus, Ratakonda is seen to use color distribution to identify key frames, and is further seen to exclude portions of the video that involve motion (i.e., pan and zoom motion) from the process of identifying key frames.

Ratakonda is not seen to disclose extracting key frames from a video sequence by determining a dominant direction for each of a plurality of frames in the video sequence from generated global motion signals for the frame, clustering a plurality of frames according to their determined dominant directions, and selecting key frames from the clusters of frames.

Therefore, for at least the foregoing reasons, Claim 1 is believed to be in condition for allowance. Further, Applicants submit that Claims 14, 17 and 22 are believed to be in condition for allowance for at least the same reasons.

The other claims are each dependent from the independent claims discussed above and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should be directed to

our address given below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Carole A. Quinn", written over a horizontal line.

Carole A. Quinn
Attorney for Applicants
Registration No.: 39,000

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-2200
Facsimile: (212) 218-2200

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